

# PATENT ABSTRACTS OF JAPAN

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(71)Applicant : MITSUBISHI ELECTRIC CORP

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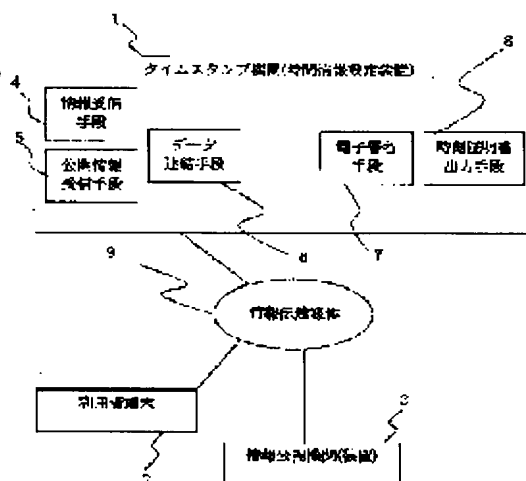
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## (54) TIME INFORMATION SETTING DEVICE AND TIME CERTIFICATION VERIFICATION DEVICE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a technology to make impossible to set up the certification time before the time to be certified in connection with a time information setting device setting up certification time to material objects and information and the time certification verification device verifying the certification time.

**SOLUTION:** A data connecting means 6 connects information received by an information receiving means 1 and open information (information not predictable beforehand; e.g. news, stock price or the like) received by an open information receiving means 5, creates a time certificate by adding an electronic signature by an electronic signature means 7 and outputs the created time certificate by a time certificate output means 8.



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## CLAIMS

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[Claim(s)]

[Claim 1]A hour entry setting device characterized by comprising the following linked to an information disclosure organization device which transmits public information about a phenomenon which cannot be expected beforehand.

A public information reception means which receives the above-mentioned public information from an information receiving means which receives object information which is the target of hour entry setting device (1) time proof having the following elements, and (2) information disclosure organization device, the above-mentioned object information which carried out (3) reception.

Data connecting mechanism which connects the above-mentioned public information which received and generates connected data, an electronic signature means to add an electronic signature to data which carried out the (4) above-mentioned connection, data which carried out the (5) above-mentioned connection.

The added above-mentioned electronic signature.

[Claim 2]The hour entry setting device according to claim 1, wherein the above-mentioned data connecting mechanism connects date information which shows time which is looked like [ the above-mentioned object information and the above-mentioned public information ], in addition is proved further.

[Claim 3]A hour entry setting device characterized by comprising the following linked to an information disclosure organization device which transmits public information about a phenomenon which cannot be expected beforehand.

The above-mentioned object information which contracted and contracted a public information reception means which receives the above-mentioned public information, and the above-mentioned object information which carried out (3) reception from an information receiving means which receives object information which is the target of hour entry setting device (1) time proof having the following elements, and (2) information disclosure organization device.

The above-mentioned public information which received.

Data connecting mechanism which generates data which connected date information which shows time to prove and was connected, an electronic signature means to add an electronic signature to data which carried out the (4) above-mentioned connection, data which carried out the (5) above-mentioned connection.

The added above-mentioned electronic signature.

[Claim 4]The hour entry setting device according to claim 3, wherein the above-mentioned information disclosure means contracts data which connected [ above-mentioned ] and exhibits contracted data.

[Claim 5]It is a hour entry setting device linked to an information disclosure organization device which transmits public information about a phenomenon which cannot be expected a priori. A public information reception means which receives the above-mentioned public information from a hour entry setting device (1) information-disclosure organization device having the following

elements, and the above-mentioned public information which carried out (2) reception, Data connecting mechanism which generates data which connected date information which shows time to prove and was connected, an electronic signature means to add an electronic signature to data which carried out the (3) above-mentioned connection, and data which carried out the (4) above-mentioned connection, A time proof format creating means which generates a print configuration showing the added above-mentioned electronic signature, a printing means which prints a print configuration which carried out (5) generation.

[Claim 6]The hour entry setting device according to claim 5 printing the above-mentioned printing means on a seal which cannot be stuck, changed and done.

[Claim 7]The hour entry setting device according to claim 5 printing the above-mentioned printing means directly on articles which are the target of time proof.

[Claim 8]Public information about a phenomenon which cannot be expected beforehand [ time proof verification device (1) ] having the following elements, A reading means which reads a print configuration showing connection data connected with date information which shows time to prove, and an electronic signature added to the above-mentioned connection data, (2) A verifying means which performs verification of the above-mentioned connection data and the above-mentioned electronic signature expressed to a read print configuration, an output means which outputs (3) verification results.

[Claim 9]The time proof verification device according to claim 8, wherein it combines the above-mentioned output means with the above-mentioned verification result and it prints price information of goods which are the targets of verification, and a name of goods.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to setting out and the verification method of time for corporeal things or information. It is related with setting out and the verification method of the time for guaranteeing the time when phenomena, such as generation and preservation, occurred, or the time which exists to software, data, information, or a product in more detail.

[0002]

[Description of the Prior Art]Drawing 12 shows the flow chart of the conventional time stamp method shown in Patent Publication Heisei 6-501571, for example. Based on drawing 12, the conventional hour entry setting out and operation of a verification system are explained. First, an author prepares the numerical document (digital data) which is a set object of time information (Step S1001). Next, hash of the document is generated (Step S1002), and the hash is transmitted to the time stamp organization which sets up time information (Step S1003). Then, a time stamp organization draws up the acceptance document which connected the hash and time information (Step S1004), and connects the present chain value with the acceptance document (Step S1005). Next, a time stamp organization generates hash of the data which connected the present chain value with the acceptance document, and makes it a new chain value (Step S1006), and the certificate in which the new chain value was described is sent to an author (Step S1007).

[0003]Since the conventional hour entry setting out and the verifying method type were what sets up time information as mentioned above using a chain value, the alteration of an order which registered the document becomes difficult and document registered order will be guaranteed. However, the justification of the time itself expressed by the certificate is not guaranteed. That is, there was a problem that a possibility that the time to the document which was able to be located in a line in order of the time series is shifted forward and backward greatly together could not be denied.

[0004]Since the data showing time is given by the numerical value or character string which generally shows time, you are not made to recognize that it is exact time intuitively to a user. That is, there was a problem of making it think that the clock used as a basis may be wrong, or the numerical value and character string which show time may have a misprint.

[0005]

[Problem(s) to be Solved by the Invention]It aims at guaranteeing that it cannot generate time information showing the time after that time in the very time which generates time information when this invention was made in order to solve the above problems, and it generates the guarantee of time, especially time information. The time which time information expresses aims at being easy to make it recognize to a user that it is the right time of those days intuitively. It prevents preventing the unjust stamp display of time, and reservation of the accuracy as time information being attained by this, for example, faking time to manufacture of perishables, dispatch, the production time of a hen's egg, dispatch, manufacture of a cooked article, generation of information, or registration.

[0006]

[Means for Solving the Problem]A hour entry setting device concerning this invention is a hour entry setting device linked to an information disclosure organization device which transmits public information about a phenomenon which cannot be expected a priori, and has the following elements. (1) A public information reception means which receives the above-mentioned public information from an information receiving means which receives object information which is the target of time proof, and (2) information disclosure organization device, and the above-mentioned object information which carried out (3) reception, A time certificate output means which connects the above-mentioned public information which received and outputs time certification information including data connecting mechanism which generates connected data, an electronic signature means to add an electronic signature to data which carried out the (4) above-mentioned connection, data which carried out the (5) above-mentioned connection, and the added above-mentioned electronic signature.

[0007]The above-mentioned data connecting mechanism connects date information which shows time which is looked like [ the above-mentioned object information and the above-mentioned public information ], in addition is proved further.

[0008]A hour entry setting device concerning this invention is a hour entry setting device linked to an information disclosure organization device which transmits public information about a phenomenon which cannot be expected a priori, and has the following elements. (1) The above-mentioned object information which contracted and contracted a public information reception means which receives the above-mentioned public information, and the above-mentioned object information which carried out (3) reception from an information receiving means which receives object information which is the target of time proof, and (2) information disclosure organization device, Data connecting mechanism which generates data which connected the above-mentioned public information which received, and date information which shows time to prove, and was connected, an electronic signature means to add an electronic signature to data which carried out the (4) above-mentioned connection, and data which carried out the (5) above-mentioned connection, A time certificate output means which outputs time certification information including the added above-mentioned electronic signature, an information disclosure means to exhibit data which carried out the (6) above-mentioned connection.

[0009]The above-mentioned information disclosure means contracts data which connected [ above-mentioned ], and contracted data is exhibited.

[0010]A hour entry setting device concerning this invention is a hour entry setting device linked to an information disclosure organization device which transmits public information about a phenomenon which cannot be expected a priori, and has the following elements. (1) A public information reception means which receives the above-mentioned public information from an information disclosure organization device, and the above-mentioned public information which carried out (2) reception, Data connecting mechanism which generates data which connected date information which shows time to prove and was connected, an electronic signature means to add an electronic signature to data which carried out the (3) above-mentioned connection, and data which carried out the (4) above-mentioned connection, A time proof format creating means which generates a print configuration showing the added above-mentioned electronic signature, a printing means which prints a print configuration which carried out (5) generation.

[0011]The above-mentioned printing means is printed on a seal which cannot be stuck, changed and done.

[0012]The above-mentioned printing means is directly printed on articles which are the target of time proof.

[0013]A time proof verification device concerning this invention has the following elements. (1) Connection data connected with public information about a phenomenon which cannot be expected a priori, and date information which shows time to prove, A reading means which reads a print configuration showing an electronic signature added to the above-mentioned connection data, an output means which outputs a verifying means which performs verification of the above-mentioned connection data and the above-mentioned electronic signature expressed to a read print configuration, and (2) (3) verification result.

[0014]The above-mentioned output means is combined with the above-mentioned verification

result, and prints price information of goods which are the targets of verification, and a name of goods.

[0015]

[Embodiment of the Invention] Embodiment 1. drawing 1 is a block diagram in Embodiment 1. In drawing 1, 1 generates time certification information to the information demanded to meet the setting request of the time certification information from a user, and the time stamp organization (hour entry setting device) to publish and 2, The user terminal which requires the time certification information over a certain information from the time stamp organization 1, and 3, The information disclosure organization (device) which publishes public information used when the time stamp organization 1 creates time certification information, and 4, The information receiving means which is the information sent from the user terminal 2, and receives the information (object information) used as the object which publishes time guarantee information, and 5, The public information reception means which receives the public information which the information disclosure organization 3 published, and 6, The data connecting mechanism which connects the information which the information receiving means 4 received, and the public information which the public information reception means 5 received, and 7, An electronic signature means to add an electronic signature to the data which the data connecting mechanism 6 connected, and 8, The time proof output means which turns the time certificate containing the electronic signature obtained by the electronic signature means 7 and the contracted data to the user terminal 2, and outputs it, and 9, It is an information transmission medium (for example, a network like the Internet is included) for exchanging information between the time stamp organization 1, the user terminal 2, and the information disclosure organization (device) 3.

[0016] Next, operation is explained. First, the user who wants to obtain the time proof to a certain information lets the information transmission medium 10 pass from the user terminal 2, and sends information or the time stamp request accompanied by the message contraction to the time stamp organization 1.

[0017] The time stamp organization 1 which received the time stamp request draws up a time certificate using the public information received from the information disclosure organization 3, and transmits it to the user terminal 2.

[0018] The details of the operation in the time stamp organization 1 are especially explained among the above-mentioned operations based on a flow chart. Drawing 2 is a flow chart which shows operation of the time stamp organization in Embodiment 1. First, the information d which is the target of time proof from a user is acquired by the information receiving means 4 (Step 101). The information which is the target of time proof is binary data showing a document, an animation, a still picture, a sound, etc.

[0019] The immediately after or public information p which the information disclosure organization 3 published by the public information reception means 5 simultaneously is acquired (Step 102). Public information is binary data showing a document, an animation, a still picture, a sound, etc., and is information which is followed on the natural phenomenon and social phenomenon which change every moment, and cannot be expected a priori. For example, it is data showing the picture of the clouds by the news flash by a news agency, stock quotations, an exchange rate, TV broadcast, a radio broadcast, weather intelligence, and a meteorological satellite, etc., and it will become conditions that time can be specified, if the data is shown. That is, the time t shall be promptly acquired from the public information p -- the time t of the phenomenon which the public information p expresses can be common knowledge, or it can refer for the time t to the information disclosure organization 3. The newest thing is received and used among such public information.

[0020] Next, the data obtained at Step 1 and Step 2 is connected by the data connecting mechanism 6 (Step 103), and the electronic signature means 7 generates electronic signature St (d+p) of the time stamp organization 1 to the data (d+p) (Step 104). The method of an electronic signature takes the hash value of data with algorithms, such as MD2 and MD5, and depends the value for enciphering with the secret key of a RSA public-key-encryption system etc.

[0021] And the connected data (d+p) and the time certificate Ct of the time t to the information

d (d) containing electronic signature St (d+p) are generated / outputted (Step 105). Drawing 3 is a figure showing the composition of the time certificate Ct in Embodiment 3 (d).

[0022]The pointer and identifier to not the data (d+p) itself connected with the time certificate Ct (d) but each data which a user can use may be sufficient. That is, when the information on the point of a pointer is managed severely, and being managed so that it cannot alter later, saving of a resource can be aimed at by transposing the inside (d+p) of the composition of data to (the pointer to pointer +p to d).

[0023]As mentioned above, since electronic signature St (d+p) of the time stamp organization 1 is included in a time certificate, the time stamp organization 1 will guarantee the relation between the information d and the public information p. Since the information disclosure organization 3 which it is common knowledge that the time which the phenomenon produced is t, or is a third party is what guarantees the occurrence time t of the public information p, the public information p tends to grasp time intuitively rather than only attaching time as digital data. Since the information which cannot be expected a priori is used, the time stamp organization 1 cannot deceive t at the time of time certificate creation, and cannot give time t' after t. That is, it can guarantee certainly that the date on which the time certificate was drawn up is not before the time which a time certificate shows.

[0024]In the embodiment more than embodiment 2., when drawing up a time certificate, the information and public information which are the targets of time proof were used, but in this embodiment, time information is further included in a time certificate. Drawing 4 is a block diagram in Embodiment 2. In a figure, 1-9 are the same as that of the thing of drawing 1, and 10 is a time information creating means which generates the data in which time information is shown.

[0025]Next, operation is explained. Fundamental operation is the same as that of Embodiment 1. In Step 2 and Step 3 in drawing 2, differing generates the data t in which time is shown by the time information creating means 10, Time information t is connected with the information d and the public information p which are the targets of time proof by the data connecting mechanism 6, and it is just going to generate a time certificate including the information on the time t. By this, electronic signature St (t+d+p) of the time stamp organization 1 will be contained in the time certificate Ct to the time t of the information d (d). Drawing 5 is a figure showing the composition of the time certificate Ct in Embodiment 2 (d).

[0026]As mentioned above, it is possible by including time information t to recognize time directly from a time certificate. The right or wrong of the time which time information shows can be checked by comparing with the time which public information shows if needed.

[0027]At the embodiment more than embodiment 3., although a time stamp organization in particular does not release information outside, either, by this embodiment, a time stamp organization carries out information disclosure of it to the exterior.

[0028]Drawing 6 is a block diagram in Embodiment 3. In drawing 6, 1-10 are the same as that of the thing of drawing 4, and 11 is an information disclosure means to release time certification information and its partial information.

[0029]Next, operation is explained. Drawing 7 is a flow chart which shows the operation in Embodiment 3. Fundamental operation is the same except for a thing and a part of Embodiment 2, and only portions corresponding after Step 103 in drawing 2 differ. At Step 111, the user's information reception means 4 receives the information d from a user first. Next, at Step 112, the public information reception means 5 receives the public information p. Next, the data t which expresses time with Step 113 by the time information \*\*\*\* means 10 is generated. Next, at Step 114, by the data connecting mechanism 6, hash value [ of the information d ] H (d) is calculated, and it connects with the time t and the public information p. Next, at Step 115, the electronic signature means 7 generates electronic signature St (t+H (d) +p). Next, the time certificate Ct (d) to the information d containing the data (t+H (d) +p) connected with electronic signature St (t+H (d) +p) by the time certificate output means 8 at Step 116 is generated / outputted. Drawing 8 is a figure showing the composition of the time certificate Ct in Embodiment 3 (d).

[0030]Next, the information which contains the connected data (t+H (d) +p) or its hash value H

( $t+H(d)+p$ ) by the information disclosure means 11 is released. A means to release these information has sending to the customer and legal adviser who store and distribute to CD-ROM, who print and publish to periodicals and who publish in the newspaper of macrochiria by E-mail for example, etc.

[0031]As mentioned above, since he is trying to exhibit ( $t+H(d)+p$ ), in order to prove that the information d existed in the time t, by using the information ( $t+H(d)+p$ ) made common knowledge can explain. It is guaranteed at least that the information d existed before rather than the time t1 when ( $t+H(d)+p$ ) was exhibited, maintaining the privacy of the information d.

[0032]The time stamp organization of self or others can generate a time certificate using this public information. In this case, it can explain as what is located earlier than the information d1 included in the time certificate in which the information d included in the used public information was generated using that public information, furthermore -- it becomes difficult to alter the context between information by repeating the same information disclosure and use of the public information -- the information d, d1, and d2 -- it can guarantee now that ... is arranged on a time series.

[0033]Although the information which is intangibles is set as the target of time proof in the embodiment more than embodiment 4., this embodiment explains the gestalt which attaches time proof to corporeal things. Drawing 9 is a block diagram in Embodiment 4. In drawing 9, 1, 3, 5-7, 9, and 10 are the same as that of the thing of drawing 1, and 12, The print configuration showing the data which connected public information and time information, and the information which includes the signatures to it for them. The time proof format creating means which generates (for example, a numerical sequence, a bar code, or a figure) etc., and 13 are printing means which print the print configuration which the time proof format creating means 12 generated to the target corporeal things.

[0034]Next, operation is explained. Till the place which generates electronic signature  $St(t+p)$  by the electronic signature means 7 from the changing public information p and time information t, it is the same except for the point which does not include the information d from the user terminal 2 in the object of connection or an electronic signature with time.

[0035]Next, the time proof format creating means 12 creates the forms (a digit string, a bar code, a schematic representation, etc.) that human being or machinery can be read, from the public information p, time information t, and electronic signature  $St(t+p)$ .

[0036]And finally it prints to the corporeal things of an object to give time proof to by the printing means 13. It is desirable to print by the method which cannot be eliminated easily or cannot be altered at this time. It prints on the seal which having stuck it on them rather than printing time proof to corporeal things directly, and a substitute being impossible or having re-covered can detect easily, and may be made to stick it on the target corporeal things.

[0037]As mentioned above, since he is trying to print to a subject the time certification information containing the public information which changes with time, those who give time proof cannot give time of the future beforehand to a subject. The time of the date of manufacture or a processing date, etc. are faked to perishables, the time of the future is given to them, and it becomes impossible for example, to make misunderstanding have that it is fresh to a customer. Since it is the form that machinery can be read, time proof is read, the alteration check by verification of a signature is performed, and a device which displays a verification result can be realized easily.

[0038]Although the embodiment 5. embodiment 4 generates time proof and shows a means to attach it to corporeal things, it shows the device which verifies the time proof attached to corporeal things by this embodiment.

[0039]Drawing 10 is a block diagram showing a time proof verification device. The reading means which reads the time proof data printed in the forms (a digit string, a bar code, other schematic representations, etc.) that 14 can read a time proof verification device and 15 can read machinery, and 16, The verifying means which verifies the read time proof, and 17 are the display and a printing means which displays or prints a verification result.

[0040]Next, operation is explained. First, the reading means 15 reads the time proof data printed in the forms (a digit string, a bar code, other schematic representations, etc.) that the machinery



attached to corporeal things can be read. The public information p, time information t, and electronic signature St (t+p) are contained in the read data. Next, the verifying means 16 performs electronic signature verification by the data (t+p) and electronic signature St (t+p) which connected the public information p with time information t. What the organization which verifies kept in the database separately, or the independent organization has published as a certificate of attestation is used for the public key used for electronic signature verification.

[0041]Before electronic signature verification or to the back, the verifying means 16 acquires the generation times of the public information p, and performs comparison with time information t. The generation times of the public information p shall be obtained by making a reference on-line to the organization which releases the public information p. The public information p is sent in the case of reference. When there is a difference more than the threshold beforehand set to time information t at the generation times obtained from the public information p, it supposes that the time proof itself is not trusted and verification will go wrong.

[0042]Next, by a display and the printing means 17, when verification is successful, time information t is printed on a display at a display or paper. This device may be built into the POS terminal used at the time of sale of goods, and the retail store of goods at this time the reading means 15, When reading commodity data with time proof data and displaying or printing a verification result, time information is displayed with the applicable name and price data of goods which were pulled out from the database which a retail store manages, and it may be made to print in a receipt.

[0043]As mentioned above, since the time proof data attached to corporeal things is read and verified and it displays and is made to print it, it can guarantee that the stage when time proof data was attached to the corporeal things is the back [ generation times / of the accompanying public information ], and it can be shown to a user. The concept of time progress is shown in drawing 11. Since the electronic signature of the attachment person of time proof data accompanies, time proof data which other persons deceived and is different cannot be attached to time proof data. Therefore, for example, it can prevent faking and attaching future time beforehand to manufacture of perishables, dispatch, the production time of a hen's egg, dispatch, manufacture of a cooked article, etc., or faking and attaching a new time proof at a retail store.

[0044]Finally, it supplements about verification which uses a time certificate. As verification, verification of a signature, verification of time, and verification of information are performed as follows.

- Verify electronic signature St of the verification time certification information Ct of a signature (d) (embodiments 1, 2, and 3).
- Obtain the time t of the verification time certification information Ct of time (d) (only in case of embodiments 2 and 3). The generation times of the public information p within the time certification information Ct (d) are checked according to the sources of information of public information (embodiments 1, 2, and 3).
- Acquire the information d on the verification time certification information Ct of information (d) (only in case of embodiments 1 and 3). Hash value [ of the information within the time certification information Ct (d) ] H (d) and the information d are compared (only in case of embodiment 2). By carrying out the above verification, it can check that the information d has already existed at the checked time t.

[0045]Although above-mentioned time is a concept which contains the date in principle, when the cycle of proof is short, even if the date is not included, there is an effective thing.

[0046]An above-mentioned hour entry setting device and time proof verification device are a computer, and each element can perform processing by a program. A program is stored in a storage and it can be read in a storage by the computer.

[0047]

[Effect of the Invention]It can guarantee that the time information which expresses the time after the time by this invention in the time which generates time information when generating time information is ungenerable. The time which time information expresses makes it recognize to a user easily that it is the right time of those days intuitively.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1]It is a block diagram in Embodiment 1.

[Drawing 2]It is a flow chart which shows operation of the time stamp organization in Embodiment 1.

[Drawing 3]It is a figure showing the composition of the time certificate Ct in Embodiment 1 (d).

[Drawing 4]It is a block diagram in Embodiment 2.

[Drawing 5]It is a figure showing the composition of the time certificate Ct in Embodiment 2 (d).

[Drawing 6]It is a block diagram in Embodiment 3.

[Drawing 7]It is a flow chart which shows the operation in Embodiment 3.

[Drawing 8]It is a figure showing the composition of the time certificate Ct in Embodiment 3 (d).

[Drawing 9]It is a block diagram in Embodiment 4.

[Drawing 10]It is a block diagram showing a time proof verification device.

[Drawing 11]The concept of time progress is shown.

[Drawing 12]The flow chart of the conventional time stamp method shown in Patent Publication Heisei 6-501571 is shown.

[Description of Notations]

1 A time stamp organization and 2 A user terminal and 3 An information disclosure organization and 4 Information receiving means, 5 A public information reception means and 6 Data connecting mechanism and 7 An electronic signature means and 8 Time proof output means, 9 An information transmission medium, 10 time-information creating means, and 11 [ A time proof verification device 15 reading means, and 16 / A verifying means, 17 displays and a printing means. ] An information disclosure means and 12 A time proof format creating means and 13 A printing means and 14

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[Translation done.]

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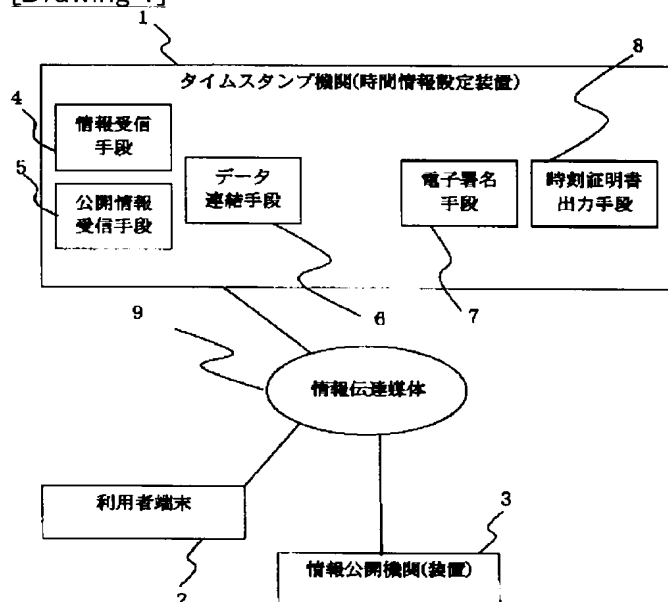
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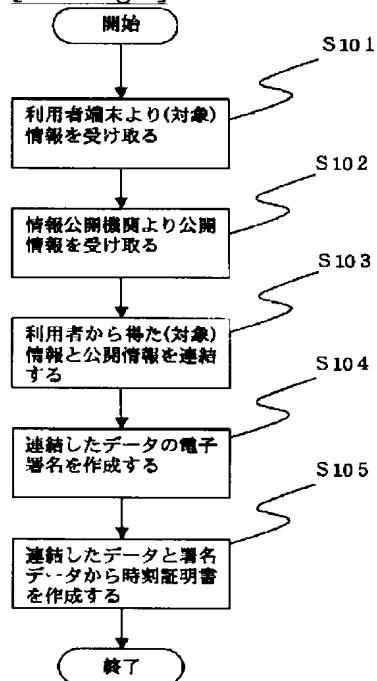
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## DRAWINGS

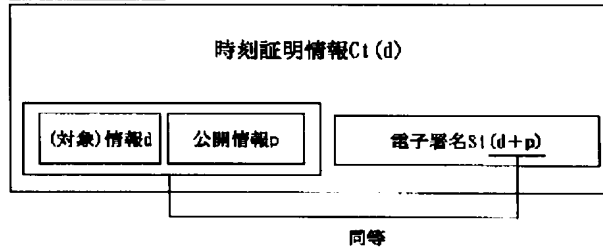
[Drawing 1]



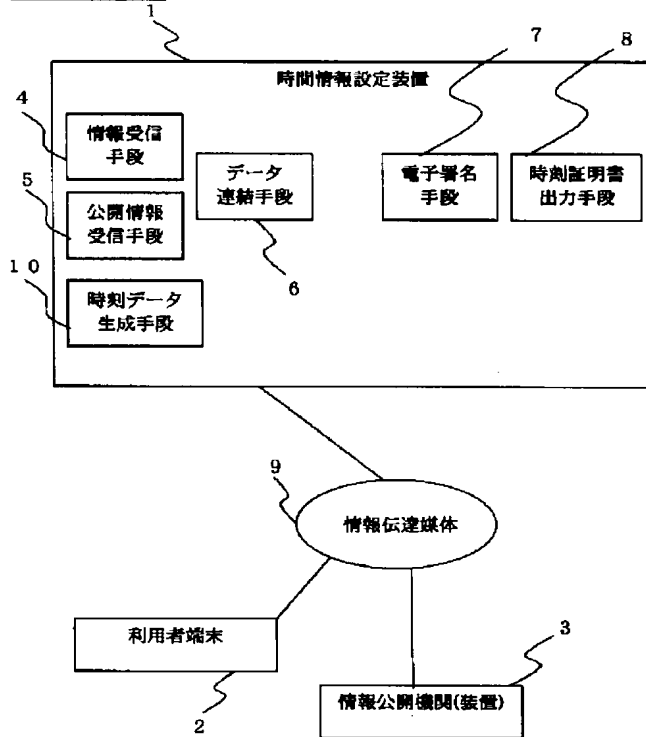
[Drawing 2]



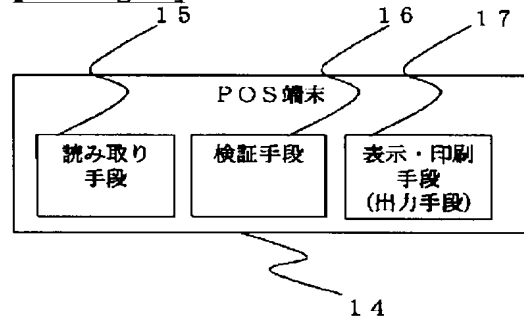
[Drawing 3]



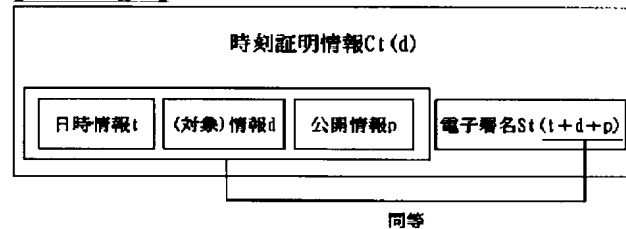
[Drawing 4]



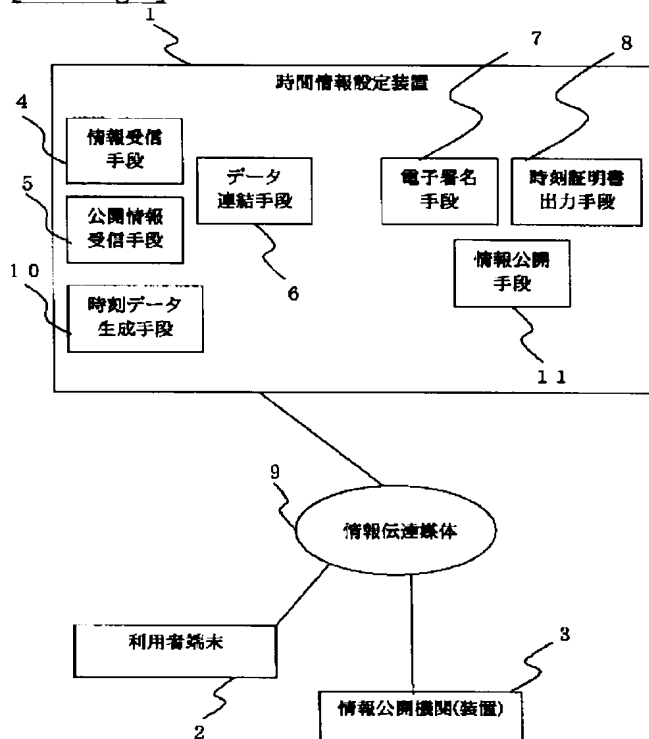
[Drawing 10]



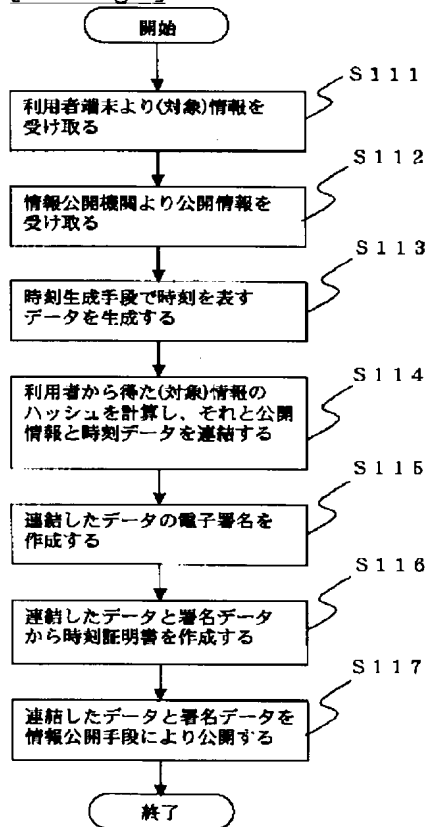
[Drawing 5]



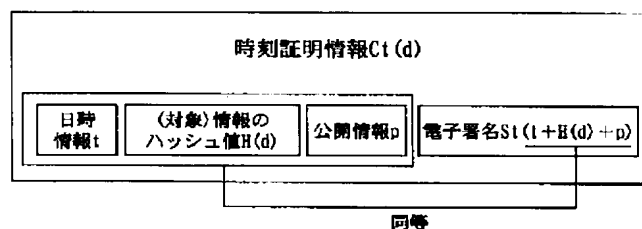
[Drawing 6]



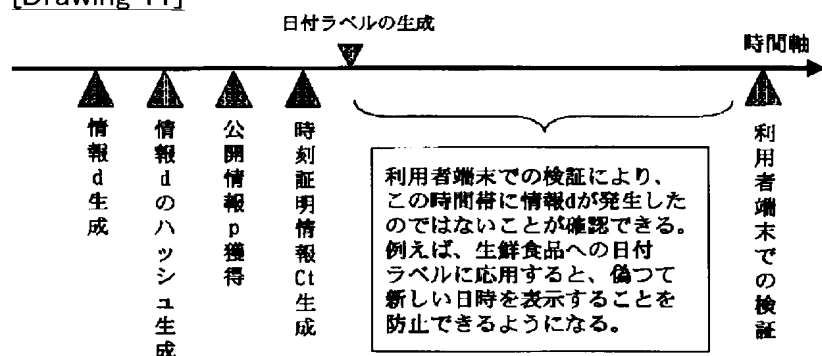
[Drawing 7]



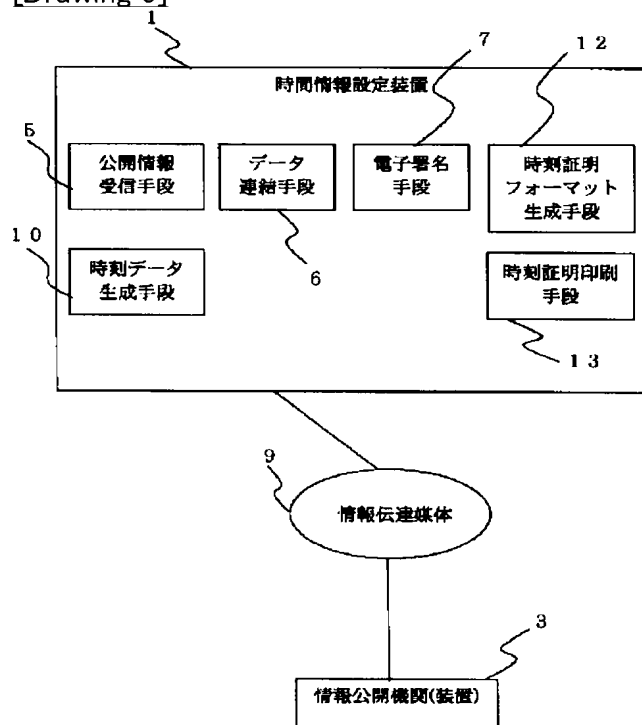
[Drawing 8]



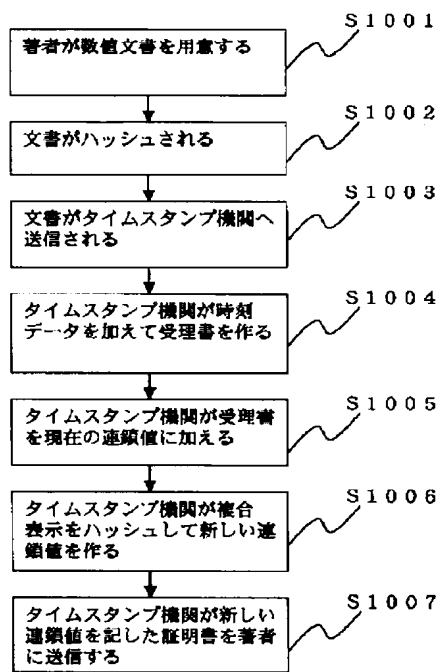
[Drawing 11]



[Drawing 9]



[Drawing 12]



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[Translation done.]